credit of perfecting its laws of operation is assigned to C. S. Peirce and to Schröder. The keynote, according to the author, is the prominence given in his memoir to three ideas, viz that of the "invariants" of a function of independent variables, that of "prime functions of independent variables," and that of the theory of "substitutions" of independent variables for independent variables. The last idea connects the algebra with the theory of groups and opens out a large field for investigation in that direction. The memoir, which occupies much space (27 pp.), is to be concluded in a subsequent number.—V. Snyder contributes a short note on a special form of annular surfaces.—On the transitive substitution groups whose order is a power of a prime number, by G. A. Miller, is a further contribution to a branch of mathematics for which the author has already done so much excellent work.—Geometry on the cubic scroll of the second kind, by F. C. Ferry, is a first instalment. Its object is to give a detailed treatment of several of the more interesting questions connected with the geometry of this scroll, and especially to consider the surfaces which can be passed through any curve on the scroll, so far as the order of those surfaces and the natures of the residual intersections are concerned. References are given to many memoirs bearing on the subject.

SOCIETIES AND ACADEMIES.

Royal Society, March 7.—"On the Heat dissipated by a Platinum Surface at High Temperatures. Part iv.—High-pressure Gases. By J. E. Petavel, A.M.I.C.E., A.M.I.E.E., John Harling Fellow of Owens College, Manchester. Communicated by Prof. Schuster, F.R.S.

The rate of cooling of a hot body in gases at pressures up to one atmosphere has received considerable attention, but with regard to gases at high pressures practically no data were up to the present available.

The present experiments were carried out with a horizontal cylindrical radiator contained in a strong steel enclosure, the enclosure being maintained at about 18° C. by a water circulation.

It is shown that the rate at which heat is dissipated by the radiator may be expressed by the following formula—

$$E = ap^{\alpha} + bp^{\beta}\vartheta,$$

where E = emissivity in C.G.S. units = total amount of heat dissipated expressed in therms (water-gramme-degrees) per square centimetre of surface of radiator per second; p = pressure in atmospheres; ϑ = the temperature of the radiator minus the temperature of the enclosure, or in other words the temperature interval in degrees Centigrade.

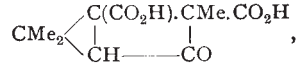
The gases studied are oxygen, hydrogen, air, nitrous oxide and carbon dioxide. In the case of the first three the formula holds good between 7 and 120 atmospheres and between 100 and 1100° C.

All the gases studied showed a rapid increase of the effective conductivity with the pressure.

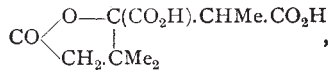
Physical Society, May 10.—Prof. S. P. Thompson, president, in the chair.—A paper on applications of elastic solids to metrology was read by Dr. Chree. The object of the present paper is to exemplify the bearing of elasticity on physical measurements. Many of the results depend ultimately on a previous paper by the author, in which expressions were obtained for the mean strains and for the change in total volume of any homogeneous elastic solid acted on by any given system of forces throughout its mass or over its surface. The effect of the pressure of a surrounding medium of constant density upon the shape and volume of an isotropic solid is considered, and the theory is extended to the case of an æolotropic solid in a medium of varying density. The change in volume of the material of the walls of a flask containing liquid is next investigated, and it is shown that the change is independent of the thickness of the walls, the mean expansion per unit of volume being inversely proportional to the whole volume. Whether the alteration consists of an increase or a decrease depends upon the dimensions of the vessel. We cannot, in general, determine the effect on the internal capacity of a vessel due to the pressure of contained liquid, but if the walls are coaxial right circular cylinders, the common axis being vertical, the solution is possible. As a numerical example a glass tube 12·7 cm. high, 10 cm. internal diameter and 1·5 mm. thick would hold 0·11 grammes more mercury than it would if inelastic. The solution is possible in the case of a spherical shell, and this problem is also investigated in the paper. The author next considers the application of the theory of elasticity to standards of length, and to give a more exact idea of the problems actually occurring in metrology he deals particularly with five forms—the standard yard, the international prototype metre of X section, a working standard belonging to the Bureau International, and two deflection bars used in magnetometers. Most modern standards are supported, not over the whole lower surface, but either on two symmetrical rollers or on three points. In using standards of length it is the horizontal projection of the graduated surface that usually concerns us, and it is proved that unless we deal with a very long bar the difference between the chord and the arc is very small. The curvatures and lengths of bars supported in various ways, both loaded and unloaded, are treated at length, and it is shown that by a proper arrangement of supports the alteration in length between two points due to bending can be rendered so small as to be of no practical importance. In the metre prototypes of X section the divisions occur on the neutral surface and their distance apart is unaffected by stretching of the material. In the case of magnetometer deflection bars it is advisable to have the magnet light and as near to the bar as possible. Mr. Watson said that it was usual in deducing the radius of a coil from the measurement of its circumference with a steel tape to diminish the result by half the thickness of the tape. He would like to know if this was the right correction to apply. In measuring the circumference of a cylinder it is necessary to wind the tape in a spiral so as to bring the divisions side by side. This gives a result which is too great, and not too small as might at first sight be imagined. Dr. Lehfeldt asked if the work of the author could be used to determine the pressure corrections of thermometers. He would like to ask why it was necessary to use supports instead of allowing a standard to rest on a flat surface. The chairman said that the paper was important because of its bearing on the question of the relation between the units of different nations. He drew attention to the alteration of the factor converting metres into inches, and asked if it was due to alterations in the properties of matter or to errors of observation. The two legal definitions of the gallon differ by an appreciable amount, and it would be interesting to know if this discrepancy could be due to changes in the volume of measures due to the liquids contained by them. Dr. Chree, in reply to Mr. Watson, said the correction would depend upon the diameter measured, because that determined the curvature of the tape and, therefore, the stretching produced. In reply to Mr. Campbell, the author stated that direct experiments had been made upon the bending of bars and they agreed well with theory. The correction formula obtained for a thermometer is similar to the ordinary one used. A bar is usually supported so as to remove the uncertainty of the distribution of surface pressure when it rests on a flat surface not a true plane. In reply to the president, Dr. Chree said that the alteration of the factor converting metres into inches was probably due to errors of observation on account of the width of the divisions of the standard yard, and on account of the difficulty of obtaining the bar at the standard temperature of 62° F.—A paper by J. Rose-Innes and Prof. S. Young, on the thermal properties of isopentane compared with those of normal pentane, was read by Mr. Rose-Innes. In previous papers the authors have investigated experimentally the thermal properties of isopentane and normal pentane and have stated certain conclusions from their observations. The present paper gives the conclusions reached after a more exhaustive examination of the experimental results of the former papers. The quantity $RT - pv$ at any volume and temperature is called the departure from Boyle's Law at that point, and it is found that there is a constant ratio between the departures from Boyle's Law of isopentane and normal pentane at the same volume and temperature. To test the law a probable value of the ratio was determined, and by means of it a large number of values of pv for isopentane were calculated from results for normal pentane. These calculated values fall upon the same curve as the observed values and agree with them to within about 1 per cent. The authors are confirmed in their previous conclusion that the difference of pressure between two isomeric substances at the same temperature and volume involves the same power of the density as the first deviation from Boyle's Law, *i.e.* the second power. Mr. J. M. Gray said the numbers obtained

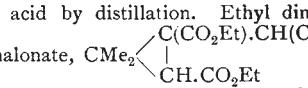
would be valuable to him and he would make use of them in his calculations. He was sorry, however, that the authors had dealt with empirical formulæ instead of rational formulæ deducible from the theory of gases. Dr. Chree asked how the temperatures were measured. Mr. Rose-Innes said that recourse had been had to empirical formulæ because they found theoretical formulæ useless. He gave examples of the failure of well-known equations to satisfy experimental results. The temperatures were measured with a constant volume air thermometer, a small correction less than the errors of experiment being employed to reduce the readings to the thermodynamic scale.—The Society then adjourned until May 31.

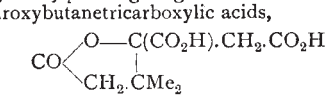
Chemical Society, May 2.—Prof. Emerson Reynolds, president, in the chair.—The following papers were read:—The synthetical formation of bridged-rings. Part 1. Some derivatives of bicyclopentane, by W. H. Perkin, jun., and J. F. Thorpe. Trimethylketobicyclopentanedicarboxylic acid,



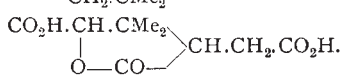
when digested with potash, yields the lactone of trimethylhydroxybutanetricarboxylic acid,



the anhydride of which is converted into the anhydride of a stereoisomeric acid by distillation. Ethyl dimethyldicarboxytrimethylenemalonate,  , is similarly hydrolysed by potash giving the lactones of the two isomeric dimethylhydroxybutanetricarboxylic acids,



and



—Lead silicates in relation to pottery manufacture, by T. E. Thorpe and C. Simmonds. Lead silicates or borosilicates, or complex silicates of lead and other metals, can be used instead of the oxides or carbonates as a means of introducing lead into pottery glazes. It is generally recognised that the employment of lead silicates for this purpose on the Continent has greatly tended to minimise the risk of lead-poisoning; this is due to the fact that the lead silicates used in the continental factories are of a high degree of insolubility so far as the lead is concerned. On examining a number of lead silicates used or proposed for use in England, many were found to be as easily attacked by dilute acids as the oxides or carbonates. The condition on which the insolubility of the lead depends was found to be, primarily, the existence of a certain ratio between the whole of the base-oxides, on the one hand, and the whole of the acid-oxides on the other. Provided that this ratio,

$$\frac{\text{number of acid molecules}}{\text{number of base molecules}},$$

falls within certain definite limits, the amount of lead extracted by dilute acids, such as the hydrochloric acid in the gastric juice, is always small.—The preparation and properties of 2 : 6-dibromo-4-nitrosophenol, by M. O. Forster and W. Robertson. This substance is prepared by the action of potassium hypobromite on paranitrosophenol in potassium hydroxide solution; a number of its derivatives are described.—The chlorination of toluene, by W. P. Wynne.

Geological Society, April 24.—Mr. J. J. H. Teall, V.P.R.S., president, in the chair.—Notes on two well-sections, by the Rev. R. Ashington Bullen. The well-section at Southwark passes through sand and gravel, &c., 34 feet, London clay 75 feet, Woolwich and Reading beds 56 feet 9 inches, and Thanet sand 36 feet 6 inches, into chalk which was bored to a depth of 148 feet. The well-section at Dallinghoo post-office, near Wickham Market (Suffolk), penetrated 53 feet of blue chalky boulder-clay, into 20 feet of sand and gravel, water being found at a depth of 79 feet.—On the geological and physical development of Antigua, by Prof. J. W. Spencer. Antigua and Barbuda rise from the bank which occupies the north-eastern portion of the chain of the Lesser Antilles. The part of the bank on which these two islands are founded is submerged to the very uniform depth of about 100 feet, but from other island-groups it is separated by depressions of 1800 to 2500 feet. It is concluded from the erosion-features of the region that the region was an extensive land-surface, probably at least 2000 feet higher than now, during the Mio-Pliocene period, and was reduced by denudation to a comparatively low elevation before the close of that time. This was followed by a submergence (the Friar's Hill) to a depth of 200 feet below the present altitude. At the close of the Pliocene period there was another elevation to an extent probably exceeding 3000 feet, as shown by the channels on the submarine plateau between Antigua and Guadeloupe. This did not continue sufficiently long to complete the dissection of the tablelands, and consequently the Antigua-Barbuda mass remains intact. Then followed a subsidence culminating in a 75-foot submergence, a re-elevation to 100 feet above the present level, when the shallow channels in the submarine bank were formed, and possibly one or two other small movements.—On the geological and physical development of Guadeloupe, by Prof. J. W. Spencer. The Guadeloupe group is separated from the Antigua and Dominica groups by depressions 2000 feet deep. Much of Guadeloupe itself consists of eruptive rocks, evidently as old as the igneous base of Antigua. The land-surface during the Mio-Pliocene period appears to have been 2000 feet above the present level, but it was submerged 200 feet at the close of the Pliocene period during the accumulation of the Lafonde and Lower Petit Bourg gravels and loams. There was a re-elevation of about 3000 feet in the early Pleistocene period, and during this epoch *Elephas* could have crossed from the continent. This was followed by a depression to 100 feet or more below the present level, a re-elevation to 150 feet, submergence below the present level with growth of corals, and the elevation of these to six or eight feet above the sea.—On the geological and physical development of Anguilla, St. Martin, St. Bartholomew and Sombrero, by Prof. J. W. Spencer. Deep channels, not less than 1800 feet deep, separate the bank on which this group is founded from the banks to the north and south. The St. Martin plateau was a land-surface throughout the Mio-Pliocene period, during the earlier part of which it appears to have stood 2500 feet above its present level, and was probably connected with the now neighbouring insular masses, from which it was disconnected by denudation during a very long period of atmospheric activity, followed by a subsidence, so as to bring the present surface of the submarine banks to a level so low that the undulating features of a base-level of erosion could be formed on them; for, during the period when the deep and broad depressions on the Antillean chain were being fashioned, the now isolated island-groups stood out as table-mountains, which were slowly being eaten away by atmospheric agents. There was next a subsidence to about 200 feet below the present level, about the close of the Pliocene period, followed by a re-elevation to 3000 feet, as shown within the area, but in reality much more. It was during this early epoch of the Pleistocene that the great rodents described by Prof. Cope reached here from South America, but the race continued to live here sufficiently long to give rise to distinct species.—On the geological and physical development of the St. Christopher Chain and Saba Banks, by Prof. J. W. Spencer. The St. Christopher (St. Kitts) ridge rises from 2000 to 2800 feet above the submarine Antillean plateau, and is for the most part covered with shallow water, except between St. Kitts and Montserrat, where a depression reaches 2592 feet, and between Statia (St. Eustacius) and Saba, where it reaches 1200 feet. Relics of old igneous formations are found on the islands, but in most places they are covered by more recent volcanic formations. The group appears to have had the same physical history as the neighbouring groups of islands.

May 8.—Mr. J. J. H. Teall, V.P.R.S., president, in the chair.—The influence of the winds upon climate during the Pleistocene epoch; a palæo-meteorological explanation of some geological problems, by F. W. Harmer. The views taken in this paper afford a simpler explanation of geological facts than those usually adopted. Instead of supposing that the climatic changes of the Great Ice Age, several times recurrent at intervals of a few thousand years, were due to astronomical or physical causes, it is suggested that the climate of the northern hemisphere being, from some unexplained cause, colder than that of our era, conditions of comparative warmth or cold may have been more or less local, affecting the great continental areas at different periods.

Entomological Society, May 1.—The Rev. Canon W. W. Fowler, president, in the chair.—Mr. C. G. Barrett exhibited for Mr. H. W. Vivian a specimen of *Xylophasia lateritia*, Hufn., a species not hitherto recorded in the British Islands, taken in South Wales by Mr. W. E. R. Allen; also *Deiopeia pulchella*, from the same district; *Dianthecia luteago*, var. *barrettii*, from one of the islands off the Glamorganshire coast, and varieties of *Eupithecia virgaureata*, much blackened, *E. lariciata*, *E. satyrata* and *E. exiguata*, taken by Mr. Vivian.—Mr. M. Jacoby exhibited specimens of *Heliocopris gigas*, L., from Mashonaland, and *Silpha biguttata*, Fairm., from Patagonia.—Sir George Hampson exhibited two females of an apterous *Lasiocampid* from the Transvaal, with cocoon and ova bred by Colonel J. M. Fawcett, 5th Lancers. The larva is very much like that of the British *Lasiocampa rubi*. The female does not emerge from the cocoon, its antennæ being aborted and all the joints coalesced with a flabellate organ with slight striæ indicating the joints; the fore tibiæ short with traces of tibial claws. The male is unknown.—Mr. H. St. J. Donisthorpe exhibited specimens of *Ripersia tomlini*, Newst., a coccid new to Britain, taken among *Lasius niger* at Portland in April 1900.—Mr. C. P. Pickett exhibited aberrations and varieties of *Lycaena bellargus*, *L. corydon* and *L. astrarche*, taken by him in August 1900 at Folkestone and Dover.—Mr. H. Goss exhibited a gynandromorphous specimen of *Lycaena bellargus* which he had taken at Reigate in June 1900. It had the characters of a male in the right wings, and the characters of a female in the left wings, which were, however, not entirely free from the blue scales of the male.—Dr. Chapman exhibited a cocoon of *Antheraea mylitta* and a flint from Redhill—two objects with practically nothing in common. Whilst dissenting *in toto* from those who see nothing in many cases of mimicry but accidental resemblance, he presented them with this as a case undoubtedly in accordance with their views, the cocoon and the flint being remarkably alike.—Prof. Poulton exhibited an apparatus invented by him to determine the strength of the formic acid discharged by the ant in defence of its nest. A discussion followed, in which Prof. Hudson Beare said he had found his skin affected by *Formica rufa*, and Mr. Donisthorpe that the skin had been removed from his hand and his gloves burnt in patches after being placed in the nest of the same species.—Mr. F. Enock exhibited numerous specimens illustrative of the metamorphoses of dragon-flies.—Mr. Enock read a paper entitled "The Metamorphoses of *Æschna cyanea*, illustrated by the electric lantern with photographs taken from life."—Sir George Hampson, Bart., communicated a paper on the classification of a new family of the Lepidoptera; Mr. Martin Jacoby a paper entitled "A further contribution to the knowledge of African Phytophagous Coleoptera"; and Mr. Gilbert Arrow a paper entitled "The Carabid genus Pheropsophus; notes and descriptions of new species."

Mathematical Society, May 9.—Dr. Hobson, F.R.S., president, in the Chair.—Major MacMahon, R.A., F.R.S., communicated two notes, on the series whose terms are the cubes and higher powers of the binomial coefficients and a case of algebraic partitionment.—Mr. J. B. Dale read a paper on the product of two spherical surface harmonics and Mr. H. M. Macdonald communicated a note on the zeros of the spherical harmonic $P_n^{-m}(\mu)$.—A note on a property of recurring series by Mr. G. B. Mathews, F.R.S., was communicated from the chair.

Royal Meteorological Society, May 15.—Mr. W. H. Dines, president, in the chair.—Mr. Rupert T. Smith read a paper on the periodicity of cyclonic winds, which was the result of a discussion of his own observations made in the neighbourhood of Birmingham during the twenty-six years 1874-1899. The equinoxes do not appear to be very stormy periods, but from the author's tables it is shown that the greatest frequency and force of cyclonic wind occurs some two weeks before the spring equinox and some three weeks after the autumn equinox.—Mr. W. Marriott gave an account of the bequest by the late Mr. G. J. Symons, F.R.S., to the Royal Meteorological Society. By his will Mr. Symons bequeathed to the Society his Cross of the Legion of Honour, the gold Albert Medal awarded to him by the Society of Arts, the testimonial album presented to him in 1879 by the fellows of the Royal Meteorological Society, and the sum of 200*l.*, as well as such of his books, pamphlets, maps and photographs of which there were no copies in the Society's library. Mr. Marriott stated that from Mr. Symons's valuable collection he had selected for the Society over 5000 books and pamphlets and about 900 photographs. A large number of the books were old and rare works, 750 bearing dates previous to 1800, while 8 were as early as the fifteenth century. By this bequest the Royal Meteorological Society now possesses the most complete and extensive meteorological library in existence.

CAMBRIDGE.

Philosophical Society, May 6.—Prof. A. Macalister in the chair.—The oscillations of a fluid in an annular trough, by Mr. B. Cookson.—Some experiments upon beams under endlong compression, by Mr. H. E. Wimperis.—Liveingite, a new mineral from the binnenthal, by Messrs. R. H. Solly and H. Jackson. This new mineral, to which the name "Liveingite" has been given in honour of Prof. G. D. Liveing, F.R.S., is a new member of the group of sulpharsenites of lead which comprise Sartorite $PbS + As_2S_3$, Rathite $3PbS + 2As_2S_3$, Dufrenoysite $2PbS + AS_2S_3$ and Jordanite $4PbS + As_2S_3$.—Note on the magnetic deflection of kathode rays, by Mr. H. A. Wilson. In this note the results of measurements of the magnetic deflection of kathode rays proceeding from kathodes of different metals are recorded. The results show that e/m is independent of the nature of the metal forming the kathode.—On the diminution of the potential difference between the electrodes of a vacuum tube produced by a magnetic force at the kathode, by Mr. J. E. Almy.—An attempt to discover radiation from the surface of metals carrying alternating currents of high frequency, by Mr. O. W. Richardson. The experiments were suggested by the corpuscular theory of the conduction of electricity in metals. The radiation expected was of the nature of secondary Röntgen rays. It was sought to detect this by its photographic effect and by the conductivity it would produce in the surrounding air. The maximum current density at the surface of the wires used was 130,000 amperes per sq. cm. and was produced by the discharge of two Leyden jars connected to an induction coil. A sensitive method was used to detect the leak, which was shown to be not greater than that generally present in air.

DUBLIN.

Royal Dublin Society, February 20.—Mr. J. Holms Pollok in the chair.—In the absence of Prof. W. F. Barrett, F.R.S., Mr. R. J. Moss read a paper by the Rev. H. V. Gill, S.J., on the stratified discharge in Geissler tubes, which was communicated to the Society by Prof. Barrett.—Prof. J. Joly, F.R.S., read a note on the pseudo-opacity of anatase.

March 20.—Sir Howard Grubb, F.R.S., in the chair.—Sir Howard Grubb read a paper on a new collimating telescope sight for large and small ordnance.—A paper entitled "Variation—Germinal and Environmental," by Prof. J. C. Ewart, F.R.S., was communicated by Prof. D. J. Cunningham, F.R.S.—Mr. J. Holms Pollok read a paper on a new thermo-chemical notation.—Prof. W. N. Hartley, F.R.S., presented a paper on the conditions of equilibrium of hygroscopic and deliquescent salts of copper, cobalt and nickel.—Dr. W. E. Adeney read a paper on ultra-violet spark spectra from the Rowland's spectrometer in the Royal University of Ireland.—Prof. W. F. Barrett, F.R.S., exhibited a series of recent radiographs.

April 17.—The Earl of Rosse in the chair.—Prof. J. Joly, F.R.S., read a paper describing a new form of electric furnace. The furnace consists of a fire-clay crucible in the walls of which a platinum wire, wound in the form of a spiral, is imbedded and through which a current is passed. Very high temperatures, up to the softening of the clay, are obtainable. A pattern in which the charged crucible is placed within an outer fire-clay vessel or muffle, heated as described, is recommended. Here the crucible may be of platinum or any refractory material. A reflector surrounds the muffle. A minute pattern was also shown in operation designed to give an intense local temperature in certain experiments on the viscosity of silicates. These furnaces are sufficiently durable to be of value in many experiments where a prolonged high temperature is required, controlable with considerable accuracy and free from flame contamination.—Prof. Joly also read a paper on a new method of identifying minerals in rock-sections by their birefringence. The degree of thinness which it is necessary to confer upon rock-sections is attended with the evil that the value of birefringence as a means of diagnosis is largely restricted to substances of high birefringence, the polarisation colours of many of the most important rock-

forming minerals thus being but little differentiated. To overcome this difficulty, while preserving to the section the desirable transparency, the author, by a simple addition to the petrological microscope, sends the polarised ray twice through the section. This is accomplished by means of an opaque illuminator, an arrangement furnished by many makers, consisting of an attachment above the objective, containing a totally reflecting prism illuminated by light received through a frontal aperture, and transmitting the ray downwards through the objective on the object being examined, from the surface of which it is reflected again into the microscope. In the present application of the illuminator to the petrological microscope a nicol is attached over the aperture, and the ray totally reflected and transmitted downwards within the objective is (sensibly) plane polarised. Beneath the rock-section a small mirror of speculum metal or silver is placed. The ray after its first passage through the crystal under examination is reflected by this mirror, and the incidence being nearly normal is again returned through the crystal, thus traversing it twice before reaching the eye. It can be demonstrated, with a double image prism and by colour observations on a plate of selenite overlapped upon itself, that the loss of phase does not interfere with the accuracy of the method. This mode of examination at once introduces discriminative differences into the tints of many important substances, as the monoclinic and triclinic felspars, quartz, &c., all former differences of retardation being, in fact, doubled in amount.—Prof. Hugh Ryan read a paper on the synthesis of glucosides, and, in conjunction with Mr. W. Sloan Mills, one on the synthesis of galactosides.—Mr. R. J. Moss made some interesting experiments with liquid air by means of the Hampson gas liquefying apparatus.

PARIS.

Academy of Sciences, May 13.—M. Fouqué in the chair.—On a perfectly astatic galvanometer, by M. Lippmann. The needle of the galvanometer described is mounted in such a way that it can be placed in the plane of the magnetic meridian and under the action of the current tends to move parallel to itself. Under these conditions the earth's field exerts no opposing force to the action of the current, and the apparatus is perfectly astatic.—On the theorems of Hugoniot, the lemmas of M. Hadamard, and the propagation of waves in viscous fluids, by M. P. Duhem.—On the real integrals of differential equations of the first order in the neighbourhood of a singular point, by M. Henri Dulac.—On certain involutive relations, by M. Maurice Lelieuvre.—On a problem of d'Alembert, by M. F. Siacci.—On an experiment in electrical oscillations, by M. H. Pellat.—The permeability of nickel-steels in intense fields, by M. René Paillot. Three classes were examined—irreversible steels, reversible steels, and steels containing small quantities of chromium and manganese besides nickel. In the first of these the magnetic permeability sensibly increased in the intense fields; in the second case, the reversible steel, the permeability attained a value of 1·19 for a field of 4000 C.G.S. units, and remained practically constant up to 30,000 units.—On the laws of outflow of air in musical instruments, by M. Firmin Larroque.—On the aromatic organomagnesium compounds, by MM. Tissier and Guignard. It is shown that the halogen benzene derivatives react with magnesium in a manner exactly analogous with the halogen compound of the fatty series. As examples of the generality of this method, the preparation of triphenyl-carbinol, dimethylphenyl-carbinol and diphenyl-ethylene are described. In all cases the yields are nearly theoretical.—The decomposition of albuminoids into protoplasmides, by M. A. Etard. Decalcified bone, submitted to a simple hydrolysis, gives three groups of substances: glycocoll, leucine and a little tyrosine; a syrupy material very soluble in methyl alcohol; and a substance quite insoluble in methyl alcohol. The last compound has been analysed and is named bos osteoplasmide.—Differences in the constitution of the bile according to the age and fatty state of the animal, by M. R. L. Craciunu.—On the phosphoric acid of the soil, by M. Th. Schlœsing, jun. An examination of the amount of phosphates removable from certain soils by repeated extraction with water.—On the composition of amblygonite, by M. Henri Lasne.—Histological researches on the sporulation of yeasts, by M. A. Guilliermond. At the moment of sporulation there appears to be a sort of solution of the red grains contained in the vacuoles, these bodies appearing to behave in some respects as a reserve material.

DIARY OF SOCIETIES.

THURSDAY, MAY 23.

ROYAL SOCIETY, at 4.30.—On the Presence of a Glycolytic Enzyme in Muscle: Sir Lauder Brunton, F.R.S, and Herbert Rhodes.—On Negative After-Images and their Relation to certain other Visual Phenomena: S. Bidwell, F.R.S.—The Solar Activity, 1833–1900: Dr. W. J. S. Lockyer.—A Comparative Crystallographical Study of the Double Selenates of the Series $R_2M(SeO_4)_2$, $6H_2O$.—Salts in which M is Magnesium: A. E. Tutton, F.R.S.—On the Intimate Structure of Crystals. Part V. Cubic Crystals with Octahedral Cleavage: Prof. W. J. Sollas, F.R.S.

ROYAL INSTITUTION, at 3.—The Chemistry of Carbon: Prof J. Dewar, F.R.S.

FRIDAY, MAY 24.

ROYAL INSTITUTION, at 9.—The Aims of the National Physical Laboratory: Dr. R. T. Glazebrook, F.R.S.

SATURDAY, MAY 25.

ROYAL INSTITUTION, at 3.—The Rise of Civilisation in Egypt: Prof. W. M. Flinders Petrie.

TUESDAY, MAY 28.

ROYAL PHOTOGRAPHIC SOCIETY, at 8.—(1) Practical Tricolour Photography; (2) The Optics of Tricolour Photography: E. Howard Farmer.

ANTHROPOLOGICAL INSTITUTE, at 8.30.—Measurements of Crania from the Fly River: J. Gray.—Anthropometrical and Craniological Notes on the Eastern Papuans: C. G. Seligmann.—Remarks on the Present State of our Knowledge of the Ethnology of British New Guinea: Prof. A. C. Haddon.

THURSDAY, MAY 30.

ROYAL INSTITUTION, at 3.—The Chemistry of Carbon: Prof. J. Dewar, F.R.S.

INSTITUTION OF ELECTRICAL ENGINEERS (Society of Arts), at 8.—Annual General Meeting.

FRIDAY, MAY 31.

ROYAL INSTITUTION, at 9.—With the Allies in China: A. H. Savage Landor.

PHYSICAL SOCIETY, at 5.—On a Model which imitates the Behaviour of Dielectrics: Prof. Fleming, F.R.S., and A. W. Ashton.—(1) On the Resistance of Dielectrics and the Effect of an Alternating Electromotive Force on the Insulating Properties of India-rubber; (2) Note on the Electrification of Dielectrics by Mechanical Means: A. W. Ashton.

SATURDAY, JUNE 1.

ROYAL INSTITUTION, at 3.—The Biological Characters of Epiphytic Plants: Prof. J. B. Farmer, F.R.S.

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